

What is claim d is:

1. A semiconductor integrated circuit chip, being made of a plate-like semiconductor chip, comprising:

5 a circuit forming layer, being formed on one side surface of the plate-like semiconductor chip, in which a plural number of circuits are formed; and

a heat transfer layer, being connected with the plate-like semiconductor chip in one body, on other side surface opposing to that where said circuit forming layer is formed, wherein said
10 heat transfer layer is made of a material similar to that of said semiconductor chip, and comprises, in an inside thereof:

a closed flow passage;

an operating fluid hermetically enclosed within said closed flow passage; and

15 driving means of said operating fluid the followings.

2. The semiconductor integrated circuit chip, as described in the claim 1, wherein both said plate-like semiconductor chip and said heat transfer layer are made of a material of silicon.

3. The semiconductor integrated circuit chip, as described
20 in the claim 1, wherein said driving means of the operating fluid is made of means for giving vibration to said operating fluid hermetically enclosed within said closed flow passage.

4. The semiconductor integrated circuit chip, as described in the claim 3, wherein said vibration giving means is made up
25 with an resistor layer.

5. The semiconductor integrated circuit chip, as described in the claim 4, wherein said resistor layer is disposed in a region where heat generation density is lower than an averaged heat

generation density of said integrated circuit chip as a whole.

6. The semiconductor integrated circuit chip, as described in the claim 1, wherein said operating fluid is water.

7. The semiconductor integrated circuit chip, as described
5 in the claim 1, wherein said plate-like semiconductor chip is of such a chip, wherein logic elements and memory elements are formed separately within the one side surface thereof, on which the circuits are formed.

8. The semiconductor integrated circuit chip, as described
10 in the claim 1, wherein the closed flow passages, being formed in said heat transfer layer, are formed in a plural number thereof, along with one side of said semiconductor chip.

9. The semiconductor integrated circuit chip, as described in the claim 8, wherein each of the closed flow passages formed
15 in the plural number thereof has the means for driving the operating fluid enclosed within an inside thereof, independently.

10. The semiconductor integrated circuit chip, as described in the claim 9, further comprising a plural number of temperature detecting means are provided within said semiconductor chip,
20 wherein said plural number of driving means provided independently are controlled depending upon temperature detection outputs from said temperature detecting means.

11. The semiconductor integrated circuit chip, as described in the claim 8, further comprising other plural number of closed
25 flow passages, being formed along with other side of said semiconductor chip, crossing over the plural number of said closed flow passages formed.

12. The semiconductor integrated circuit chip, as described in the claim 11, wherein each of said closed flow passages formed
30 in the plural number thereof has means for driving the operating fluid enclosed within an inside thereof, independently.

13. The semiconductor integrated circuit chip, as described in the claim 12, further comprising a plural number of temperature detecting means are provided within said semiconductor chip, wherein said plural number of driving means provided independently
5 are controlled depending upon temperature detection outputs from said temperature detecting means.

14. A semiconductor integrated circuit chip, comprising:

a plate-like semiconductor chip;

a circuit forming layer, being formed on one side surface
10 of said plate-like semiconductor chip, on which a plural number of circuits are formed; and

a heat transfer layer, being formed on other side surface opposing to the side surface on which said circuit forming layer is formed, for suppressing a local increase of temperature caused
15 due to heat generation of the circuit within said circuit forming layer of said semiconductor chip, being connected therewith in one body.

15. A semiconductor integrated circuit device, comprising:

a semiconductor integrated circuit chip, in a part of which
20 are formed circuits in a plural number thereof;

a mounting board, in a part of which are formed wiring patterns, for mounting said integrated circuit chip thereon;

a case for receiving said mounting board, on which said integrated circuit board is mounted, in an inside thereof; and

25 a plural number of terminals, being planted outside from said case or said mounting board, and being electrically connected to the circuits formed on said semiconductor integrated circuit chip, wherein said semiconductor integrated circuit chip is such the semiconductor integrated circuit chip as described in the claim

30 1.

16. The semiconductor integrated circuit device, as described in the claim 15, further comprising a heat sink, being attached on a part of an outer surface of said case.

17. The semiconductor integrated circuit device, as
5 described in the claim 15, wherein the electric power to be supplied to said driving means, which is formed in said heat transfer layer of said semiconductor integrated circuit chip, is a part of the electric power to be supplied to said semiconductor integrated circuit chip through said terminals of said semiconductor
10 integrated circuit device.

18. A semiconductor integrated circuit device, comprising:

a semiconductor integrated circuit chip, in a part of which are formed circuits in a plural number thereof;

a mounting board, in a part of which are formed wiring patterns,
15 for mounting said integrated circuit chip thereon;

a case for receiving said mounting board, on which said integrated circuit board is mounted, in an inside thereof; and

a plural number of terminals, being planted outside from said case or said mounting board, and being electrically connected
20 to the circuits formed on said semiconductor integrated circuit chip, wherein said semiconductor integrated circuit chip is such the semiconductor integrated circuit chip as described in the claim 14.

19. The semiconductor integrated circuit device, as
25 described in the claim 18, further comprising a heat sink, being attached on a part of an outer surface of said case.

20. The semiconductor integrated circuit device, as described in the claim 18, wherein the electric power to be supplied to said driving means, which is formed in said heat transfer layer
30 of said semiconductor integrated circuit chip, is a part of the electric power to be supplied to said semiconductor integrated

circuit chip through said terminals of said semiconductor integrated circuit device.